

Remarks

In view of the above amendments and the following remarks, reconsideration and further examination are requested.

Claims 1, 4, 5, 7, 8, 10-15 and 22-25 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Takahashi (US 5,672,091) in view of Stephan (AU 245213) and Birang (US 5,964,643).

Claims 1-25 have now been cancelled without prejudice or disclaimer to the subject matter contained therein. New claims 26-35 have been added.

The above-mentioned rejection is submitted to be inapplicable to the new claims for the following reasons.

Claim 26 is patentable over the combination of Takahashi, Stephan and Birang, since claim 26 recites a polishing apparatus having, in part, a polishing table having a polishing surface including an outer peripheral portion and a main part and at least one notch formed in the outer peripheral portion of the polishing surface, wherein the main part of the polishing surface has no through-holes. The combination of Takahashi, Stephan and Birang fails to disclose or suggest a polishing table as recited in claim 26.

Takahashi discloses a polishing apparatus having an end point detection device. The polishing apparatus has a top ring 2 operable to hold a wafer F against a turntable 1 to polish a surface of the wafer F. The polishing apparatus also has a detection device including a beam emitter section 3 and a beam receiver section 4. The beam emitter section 3 and the beam receiver section 4 are positioned beyond an outer most edge of the turntable 1. When the wafer F being polished is to be checked to determine whether the polishing has been completed, the top ring 2 moves the wafer F laterally so that an edge portion of the polished surface of the wafer F overhangs the turntable 1 above the location of the beam emitter section 3 and the beam receiver section 4. (See column 3, lines 44-67 and Figure 1). It is apparent that Takahashi fails to disclose or suggest that the turntable 1 has at least one notch formed in an outer peripheral portion thereof. Therefore, either Stephan or Birang must disclose or suggest this feature in order for the present invention as recited in claim 26 to be rendered obvious by the combination of Takahashi, Stephan and Birang.

In the combination, Stephan is relied upon as disclosing the at least one notch in the turntable. Stephan discloses a grinding disc 1 with a number of windows 2 and marginal slots 3 located therein. The positioning and shape of the windows 2 and the marginal slots 3 are such that when the grinding disc 1 is rotated, an optical effect is created which results in a work piece on a side of the grinding disc 1 opposite to the user to appear to be completely visible. (See page 3, lines 6-25 and Figures 1 and 2). However, it would not have been obvious to combine the marginal slots 3 of Stephan with the turntable 1 of Takahashi.

Initially, it is noted that the grinding disc 1 of Stephan has a publication date of 1963 and appears to be related to a general-purpose disc that is used to manually grind a work piece of, for example, metal. On the other hand, the present invention is related to a polishing apparatus for precision polishing a surface of a substrate to a high degree. As cited in M.P.E.P. §2141.01(a), the Federal Circuit has held that "[i]n order to rely on a reference as a basis for a rejection of an applicant's invention, the reference must either be in the field of the applicant's endeavor or, if not, then be reasonably pertinent to the particular problem in which the invention was concerned." In re Oetiker, 977 F.2d 1443, 1446 (1992).

As detailed above, it is apparent that the grinding disc 1 is a general purpose grinding disc to be used during the manual grinding of a work piece. This is clearly not the same field of endeavor as the present invention, which concerns the precision polishing of a substrate on which, for example, electronic circuits are formed. Further, the windows 2 and the marginal slots 3 are designed such that the operator of the grinding disc 1 who is manually grinding the work piece can observe the work piece through the disc 1. On the other hand, the at least one notch in the polishing surface of the present invention is such that the substrate being polished does not have to be swung as far off of the polishing surface to have the at least one optical measuring device measure a thickness of a layer formed on a surface of the substrate. Therefore, it is apparent that Stephan is not in the same field of endeavor as the present invention. It is also apparent that Stephan is concerned with creating an improved see-through grinding disc, which is different than lowering the possibility of damage occurring to a substrate while it is being

measured, addressed by the present invention. Therefore, it is submitted that Stephan is non-analogous art that cannot be relied upon under 35 U.S.C. §103.

Also, as discussed in M.P.E.P. §2141.02, “[a] prior art reference must be considered in its entirety, i.e., as a whole, including portions that would lead away from the claimed invention.” This section of the M.P.E.P. relies on the holding of W.L. Gore & Associates, Inc. v. Garlock, Inc., 721 F.2d 1540 (Fed. Cir. 1983). As discussed above, Stephan discloses that it is the combination of the marginal slots 3 and the windows 2 which allows for the production of the optical effect of seeing the work piece on the opposite side of the grinding disc 1. Since the optical effect is the basis of the invention of Stephan, it is apparent that the marginal slots 3 and the windows 2 must be considered as a single entity because the combination of the two is required to produce the optical effect. Therefore, it would not have been obvious to combine just the marginal slots 3 with the turntable 1 of Takahashi. Taking this into consideration, by combining the marginal slots 3 and the windows 2 with the turntable 1 of Takahashi, the main part of the turntable 1 would then contain the windows 2, and therefore, would not meet the limitation of claim 26 of the main part of the polishing surface having no through-holes.

Further, it would not have been obvious to modify the turntable 1 of Takahashi with the combination of the windows 2 and the marginal slots 3 of Stephan. As can be clearly seen from Figures 1 and 2 of Stephan, the addition of the windows 2 to the turntable 1 of Takahashi would create two negative effects of (1) reducing the surface area of the turntable 1 and (2) reducing the ability of the turntable 1 to polish the wafer F to a high degree of flatness than would be the case if just the marginal slots 3 were present. However, as discussed above, the marginal slots 3 and the windows 2 are both necessary for the grinding disc 1 of Stephan to work properly and cannot be considered separately. Therefore, this additional loss of surface area of the turntable 1 due to the windows 2 results in a lower polishing efficiency which, in turn, results in longer processing times of the wafer W on the turntable 1 to achieve the same effect. Also, the windows 2 lower the ability of the turntable 1 to polish the wafer 2 to a high degree of flatness. As a result, it would not have been obvious to combine the windows 2 and the marginal slots 3 of Stephan with the turntable 1 due to these negative effects.

For the above reasons, it would not have been obvious to combine only the marginal slots 3 of Stephan with the turntable 1 of Takahashi. Additionally, combining the marginal slots 3 and windows 2 of Stephan with the turntable 1 of Takahashi would not meet the limitations of claim 26 and also would not have been obvious. Therefore, in order for the combination of Takahashi, Stephan and Birang to render claim 26 obvious, Birang must disclose or suggest the at least one notch of claim 26. However, Birang is relied upon as disclosing a top ring that oscillates with a swinging motion and does not disclose or suggest the at least one notch as is recited in claim 26. As a result, the combination of Takahashi, Stephan and Birang fails to disclose or suggest the present invention as recited in claim 26.

As for claims 31 and 35, they are patentable over the combination of Takahashi, Stephan and Birang for similar reasons as set forth above in support of claim 26. That is, claims 31 and 35, like claim 26, each recite a polishing apparatus having, in part, a rotatable polishing table having a polishing surface including a center portion, an outer peripheral portion, and an intermediate portion between the center portion and the outer peripheral portion and at least one notch formed in the outer peripheral portion of the polishing surface, wherein the intermediate portion of the polishing surface has no through-holes, which features are not disclosed or suggested by the combination of Takahashi, Stephan and Birang.

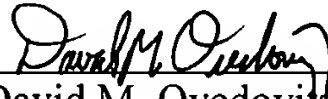
Because of the above mentioned distinctions, it is believed clear that claims 26-35 are allowable over the combination of Takahashi, Stephan and Birang. Furthermore, it is submitted that the distinctions are such that a person having ordinary skill in the art at the time of invention would not have been motivated to make any combination of the references of record in such a manner as to result in, or otherwise render obvious, the present invention as recited in claims 26-35. Therefore, it is submitted that claims 26-35 are clearly allowable over the prior art of record.

In view of the above amendments and remarks, it is submitted that the present application is now in condition for allowance. The Examiner is invited to contact the undersigned by telephone if it is felt that there are issues remaining which must be resolved before allowance of the application.

Respectfully submitted,

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